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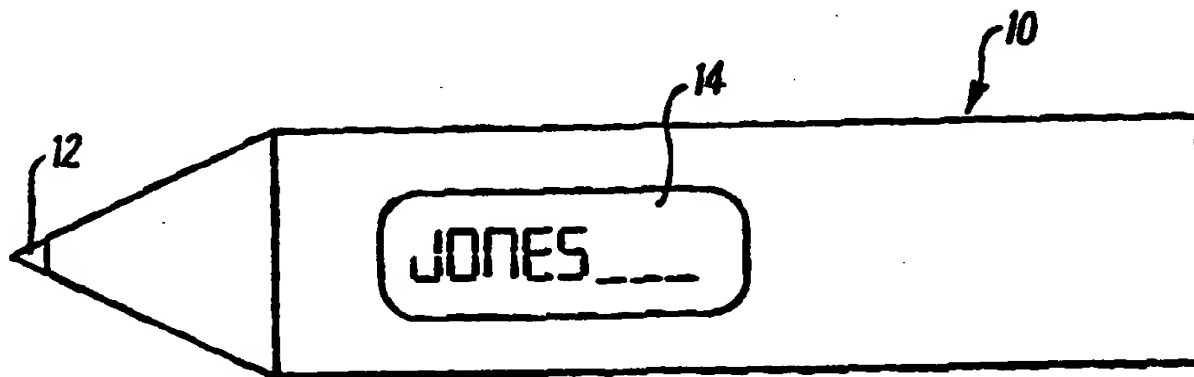
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(54) Title: RECORDING SYSTEM



(57) Abstract

A recording system and its method of operation for the collection and reporting of information relating to the occurrence and/or timing of activities, events, or conditions. The recording system has inputting means for inputting and internally storing information identifying the activity, etc.; time recording means for internally recording the timing and/or duration of the activity, etc.; and downloading means for subsequently and selectively downloading internally stored information directly to an external computer for processing of the information. The recording system is realised as a hand-held device (10; 20; 30) which is highly portable and easily operated, allowing contemporaneous recording without reliance on the user's memory of events. Unlike a multi-task computer terminal, the recording system is dedicated to its single use, and is always available. The invention is applicable to work records, medical experiments, and sociological monitoring.

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1     "Recording System"

2

3     This invention relates to a recording system, and  
4     relates more particularly but not exclusively to a  
5     system for recording the occurrence and/or timing of  
6     activities, events or conditions for the purpose of  
7     time measurement within commerce, industry, education  
8     and scientific/medical/pharmaceutical/consumer  
9     research. Such recording may be used, for example, for  
10    the purposes of the evaluation or monitoring of  
11    processes, customer billing, speed of task performance,  
12    or noting changes in physiological parameters over  
13    time. The information generated by this recording is  
14    normally collated and manipulated after the point of  
15    recording in a variety of ways according to its  
16    application.

17

18    In this field systems already exist to perform the act  
19    of recording. These known systems include:

20

21    a)   the simple writing down, by means of pencil and  
22    paper, of activity, date, time and duration, eg, in the  
23    form of a table. The act of writing these details may  
24    occur at the time of the activity being recorded, or at  
25    an earlier or later time. This form of recording is,

1 in the case of the record of an employee's time, called  
2 a time sheet.

3  
4 b) manual entry of the details of the information  
5 into a computer, probably in the form of a database.  
6 In the case of a desk-top computer this will often take  
7 place after the activity, for example when the computer  
8 is not to hand at the time that the activity takes  
9 place. The paper and pencil system at a) may be used  
10 as an aide memoire to facilitate this system.

11  
12 c) manual entry of the details of the activity into a  
13 computer, typically a portable computer, at the time at  
14 which they occur.

15  
16 Known recording systems have various limitations and  
17 disadvantages. The paper and pencil system suffers  
18 from a lack of accuracy, particularly if performed  
19 before or after the activity itself. Furthermore it is  
20 inherently inconvenient, requiring the relatively  
21 complex and time consuming act of manually making the  
22 record entry. In practice, it is noted that time  
23 sheets in industry and commerce are often compiled from  
24 memory, commonly up to a week after events being  
25 recorded, with concomitant loss of accuracy. This  
26 system suffers from a further disadvantage, namely that  
27 the information is not in a suitable form for  
28 subsequent use of manipulation by computer (eg  
29 producing billing information, incorporation in  
30 management reports). To do so requires copying of the  
31 information by hand into a computer database. This  
32 last disadvantage is overcome by the computer-based  
33 system mentioned at b) above, but suffers another  
34 disadvantage - to achieve good accuracy, the computer  
35 has to be available at the time. If it is not then  
36 either the individual's memory is relied on, or a paper

1 and pencil system is interposed, and the disadvantages  
2 of complexity and time consumption detailed above are  
3 still present.

4  
5 The system mentioned at c) above represents, in some  
6 respects, the current best practice, and fully gets  
7 round the problems of inaccuracy and dependence on a  
8 permanently-sited computer. However, there still  
9 remains the primary disadvantage of all computer-based  
10 time recording, namely that the device used to enter  
11 the information is a computer and that the individual  
12 performing the recording has to be able to use that  
13 computer to make the recording. The complexity of  
14 operating the computer represents a real obstacle to a  
15 large spectrum of those for whom time recording would  
16 be advantageous, either for themselves or for their  
17 employers, and may offer little or no reduction in the  
18 time taken by the user in the act of recording.  
19 Further, computing resources may be committed to other  
20 tasks at the time that recording is required.

21  
22 According to a first aspect of the present invention  
23 there is provided a recording system for the collection  
24 and reporting of information relating to the occurrence  
25 and/or timing of activities, events, or conditions, the  
26 recording system comprising

27  
28 (a) inputting means for inputting and internally  
29 storing information identifying or otherwise  
30 relating to an activity, event, or condition;

31  
32 (b) recording means for recording and internally  
33 storing information relating to the duration  
34 and/or time of occurrence of said activity, event,  
35 or condition; and  
36

1 (c) downloading means for subsequently and selectively  
2 downloading the internally stored information to  
3 an external computer for processing of the  
4 information therein.

5  
6 Said inputting means preferably comprises a plurality  
7 of input means, each said input means being associated  
8 with a preselected activity, event, or condition. Each  
9 said input means is preferably capable of being  
10 associated with selected types and/or classes of  
11 activity, event, or condition. Said inputting means  
12 may contain a source of pre-stored signals representing  
13 predetermined activities, events, or conditions, and  
14 the source may be such that a predetermined signal may  
15 be selected by scrolling through the pre-stored  
16 signals. Said inputting means may include audio signal  
17 generation means operable to indicate correct selection  
18 of an input means and/or to indicate the elapse of a  
19 predetermined period of time associated with a  
20 particular activity, event, or condition. The  
21 inputting means may comprise a bar-code reader means  
22 preferably comprising visual display means operable to  
23 display a de-coded reading or to display an alternative  
24 message otherwise indicative of a read bar-code.

25  
26 The recording means preferably comprises clock means  
27 which may indicate absolute time (ie time of day, and  
28 date) and/or elapsed time since initiation.

29  
30 The downloading means may comprise fibre-optic cable  
31 means, infra-red broadcast or beam transmission means,  
32 closed-channel radio transmission means, or close-range  
33 inductive coupling means. The downloading means may be  
34 capable of uploading signals which may be appropriate  
35 for programming or reprogramming the recording system.

36

1 According to a second aspect of the present invention  
2 there is provided a method of collecting and reporting  
3 information relating to the occurrence and/or timing of  
4 activities, events, or conditions, said method  
5 comprising the steps of:

- 6
- 7 (a) providing a recording system according to the  
8 first aspect of the present invention;  
9
- 10 (b) selecting an activity, event, or condition about  
11 which information is to be collected and reported;  
12
- 13 (c) operating the inputting means of said recording  
14 system to input and internally store information  
15 identifying or otherwise relating to the selected  
16 activity, event, or condition;  
17
- 18 (d) operating the recording means of said recording  
19 system to record and internally store information  
20 relating to the duration and/or time of occurrence  
21 of the selected activity, event, or condition; and  
22
- 23 (e) subsequently coupling the downloading means of  
24 said recording system to an external computer and  
25 selectively downloading the internally stored  
26 information to said external computer for  
27 processing of the information therein.

28

29 Where the recording means of said recording system  
30 comprises clock means which indicates only elapsed time  
31 since initiation (ie without indication of time of day,  
32 or date) and where the selected activity, event, or  
33 condition is continuous from initiation to downloading,  
34 or where a plurality of selected activities, events, or  
35 conditions are individually continuous and mutually  
36 consecutive such as to constitute a continuous series

1 from first initiation until downloading, the external  
2 computer is preferably programmed and operated to  
3 calculate the absolute time and date of the initiation  
4 or the respective initiation of the or each activity,  
5 event, or condition by subtracting the elapsed time or  
6 respective succession of elapsed times from the  
7 absolute time of downloading.

8  
9 Embodiments of the invention will now be described by  
10 way of example, with reference to the accompanying  
11 drawings wherein:-

12  
13 Figs 1 and 2 are respectively a side elevation and  
14 an end elevation of a portable time recording unit  
15 comprising a bar-code reader;

16 Figs 3 and 4 are respectively a front elevation  
17 and a side elevation of a portable time recording  
18 unit having manual inputs and written or printed  
19 indicia; and

20 Figs 5 and 6 are respectively a front elevation  
21 and a side elevation of a portable time recording  
22 unit having manual inputs and electronic  
23 indicators.

24  
25 The preferred embodiments of the invention comprise  
26 three aspects:

- 27  
28 (1)- A portable time recording unit (hereinafter  
29 referred to as a "PTRU");  
30 (2)- A port method (hereinafter referred to as a "PM")  
31 which is actually a combination of hardware and  
32 its associated operating procedures, by which  
33 information can be downloaded from the PTRU to an  
34 external computer; and  
35 (3)- a specially-written piece of software (ie a  
36 special-purpose computer program).



1 In its simplest possible form, the PTRU is a small  
2 piece of equipment (preferably of a size and weight  
3 enabling it to be hand-held) capable of recording a  
4 series of events, including a reference identifying the  
5 events, and the duration of each of these events,  
6 either as an absolute temporal reference or as one  
7 relative to a known point of time. The events normally  
8 represent the commencement of a task or activity but  
9 may represent any predetermined facet of a task or  
10 activity. The PTRU digitally stores all data  
11 generated. This aspect of the PTRU may be termed the  
12 input function.

13  
14 The PTRU must also have the capability of transmitting  
15 the event records, through the PM, to the software.  
16 This aspect of the PTRU may be termed the output  
17 function.

18  
19 The above-detailed input and output functions represent  
20 the primary facilities covered by the invention. An  
21 example of a further element useful to a practical  
22 implementation is a visual indication of the event,  
23 task or activity currently recorded. There follows  
24 three practical realizations of the PTRU, which  
25 illustrate various means of achieving the input  
26 function.

27  
28 Referring now to Figs 1 and 2, these illustrate a first  
29 embodiment of a PTRU arrangement 10 in which the  
30 information input function is achieved by inputting  
31 means in the form of a bar-code reading device 12  
32 (Fig. 1) integrally mounted at one end of the PTRU 10.  
33 To use the PTRU 10 to collect information, the PTRU s  
34 held in the user's hand and the reading device 12 is  
35 drawn across a selected bar-code (not shown) in a menu  
36 of pre-printed bar-codes each signifying a different

1 activity, event, or condition. The PTRU 10 includes an  
2 LCD (Liquid Crystal Display) 14 in one face to display  
3 a decoded version of the newly-read bar-code (shown in  
4 Fig. 1 by way of example as "JONES"). The LCD 14  
5 allows the user to check the correctness of the  
6 selection of bar-code, and the correct inputting of its  
7 information.

8  
9 Simultaneously with the reading of the bar-code by the  
10 reading device 12, an internal clock (not shown)  
11 forming part of the PTRU 10 is initiated to record the  
12 instantaneous absolute time (ie time of day, and date).  
13 The recorded time is associated in the internal memory  
14 or information storage unit (not shown) of the PTRU  
15 with the information from the newly-read bar-code to  
16 correlate the respective items of information, such  
17 that these items will subsequently be downloaded  
18 together.

19  
20 Additionally or alternatively to recording absolute  
21 time, the clock can be started to record elapsed time  
22 from the reading of the bar-code (in a manner analogous  
23 to use of a stop-watch).

24  
25 By suitably modifying or substituting the bar-code  
26 reading device 12, the PTRU 10 can be adapted to  
27 operation with alternative forms of machine-readable  
28 indicia (not shown), eg encoded magnetic strips.

29  
30 At an appropriate subsequent time, the foregoing  
31 procedure for operating the PTRU 10 is repeated in  
32 conjunction with another bar-code (or alternative  
33 machine-readable indicia) whose information content  
34 signifies "end of charging period" or an analogous  
35 command message.

36

1 When it is subsequently intended to download the  
2 information input to and stored in the PTRU 10, the  
3 PTRU 10 is transported to a suitable PTRU reading  
4 terminal (not shown) and coupled thereto by means of a  
5 suitable PM connector 16 (Fig. 2) integrally mounted in  
6 the end of the PTRU 10 opposite the reading device 12.  
7 The connector 16 provides an information transmission  
8 path for downloading stored information from the PTRU  
9 10 into the terminal according to the predetermined PM  
10 ("port method). Thereafter the downloaded information  
11 can be computer processed.

12

13 Referring now to Figs 3 and 4, these illustrate a  
14 second embodiment of the PTRU 20 which is designed and  
15 arranged to record activities, events, or conditions by  
16 means of the manual operation of a selected  
17 push-button. As shown in Fig. 3, the PTRU 20 has eight  
18 push-button switches 22 arranged in two columns on the  
19 face of the PTRU 20. In a respective row to the right  
20 of each of the push-button switches 22 is an indicator  
21 lamp 24 and a label 26. Depression of a selected one  
22 of the push-button switches 22 causes illumination of  
23 the respective lamp 24 to provide a visual indication  
24 of switch operation to initiate recording of time in  
25 respect of a specific activity, event, or condition as  
26 denoted on the respective horizontally adjacent label  
27 26.

28

29 The indicator lamp 24 may be substituted by alternative  
30 forms of indicator.

31

32 The labels 26 may be hand-written or otherwise marked  
33 (eg the labels 26 may be typed or printed).

34

35 Instead of the push-button switches 22 representing up  
36 to eight different activities, etc, they could be

1 allocated to two or more groups, with each group having  
2 a different function allocated to it. For example,  
3 suppose one column of four of the push-button switches  
4 22 (designated A1, A2, A3 and A4) are respectively  
5 allocated to one of four different activities, and the  
6 other column of four of the push-button switches 22  
7 (designated C1, C2, C3 and C4) are respectively  
8 allocated to one of four different clients. With this  
9 organisational arrangement, use of the PTRU 20 to  
10 record activity A2 on behalf of client C4 could be  
11 initiated by the simultaneous depression of push-button  
12 switches 'A2' and 'C4'.

13  
14 At the conclusion of the charging period (eg at the  
15 termination of an activity, etc, or transfer of a  
16 continuing activity to the account of a different  
17 client), charging can be stopped in respect of that  
18 client and immediately transferred to a new client, or  
19 to a general category to achieve a contiguous record,  
20 by depression of an appropriately allocated one of the  
21 push-button switches 22.

22  
23 When it is subsequently intended to download the  
24 information input to and stored in the PTRU 20, the  
25 PTRU 20 is transported to a suitable PTRU reading  
26 terminal (not shown) and coupled thereto by means of a  
27 suitable PM connector 28 (Fig. 4) integrally mounted in  
28 one end of the PTRU 20. The connector 28 provides an  
29 information transmission path for downloading stored  
30 information from the PTRU 20 into the terminal  
31 according to the predetermined PM ("port method").  
32 Thereafter the downloaded information can be computer  
33 processed.

34  
35 Referring now to Figs 5 and 6, these illustrate a third  
36 embodiment of a PTRU 30 in which electronic display

1 devices are utilised to indicate the current client and  
2 activity, etc. Mounted in the face of the PTRU 30  
3 (Fig. 5) are a first LCD 32 and a second LCD 34.  
4 Alongside each of the LCDs 32 and 34 are a respective  
5 pair of push-button switches 36 and 38. Information to  
6 be displayed on each of the LCDs 32 and 34 are  
7 contained within the internal memory (not shown) of the  
8 PTRU 30 in the form of respective lists of words,  
9 codes, names, activities, events, conditions, or other  
10 descriptors, etc. Operation of the appropriate one of  
11 the push-button switches in each pair 36 and 38 causes  
12 the respective display 32 or 34 to scroll up or down  
13 the respective list until push-button depression is  
14 terminated upon an intended display being reached and  
15 observed on the respective display. When both displays  
16 36 and 38 show intended selections, a further  
17 push-button switch 40 is depressed to initiate time  
18 recording against the selected allocation. As shown by  
19 way of example in Fig. 5, client "JONES" is having the  
20 activity "DRAUGHTING" charged to him. In an  
21 alternative operational arrangement, the selection of  
22 job and client could be carried out within a set period  
23 after push-button switch 40 is used to initiate time  
24 recording.

25  
26 As compared to the first and second embodiments, the  
27 third embodiment of PTRU 30 has the advantages of  
28 allowing an indefinitely large number of items of  
29 information (eg, client names, types of activity, etc)  
30 without the previous limitation of one item per  
31 bar-code or push-button switch. In other words, the  
32 third embodiment enables variables to be stored in  
33 internal memory as virtual items selectable by  
34 scrolling, and does not depend on having a respective  
35 switch or other item of physical hardware for each  
36 item. The displays 32 and 34 may also be utilised to

1 review internally stored information.

2

3 At some suitable selected subsequent time, information  
4 recorded and stored in the PTRU 30 is downloaded to a  
5 PTRU-reading terminal (not shown) by means of a PM  
6 connector 42 (Fig. 6) forming part of the PTRU 30. The  
7 connector 42 provides an information transmission path  
8 for downloading stored information from the PTRU 30  
9 into the terminal according to the predetermined PM  
10 ("port method"). The downloaded information can  
11 thereafter be computer processed. The PM connector 42  
12 also allows uploading of information, data and  
13 programming instructions to the PTRU 30, thus enabling  
14 (for example) updating and alteration of the internally  
15 stored lists of names, activities, etc, previously  
16 described, and/or modification of operational aspects  
17 of the PTRU 30.

18

19 In the first, second and third embodiments described  
20 above, there was a manual aspect to each inputting  
21 means (eg manual swiping of a bar-code, manual  
22 depression of a push-button). It is within the scope  
23 of the invention to utilise inputting means of the  
24 other kinds, eg voice recognition means enabling input  
25 to be made verbally.

26

27 Input arrangements, including those detailed above, may  
28 be enhanced by the inclusion of a buzzer, or other  
29 noise-making device, making a sound, either on a  
30 regular basis or on a random basis, to draw the user's  
31 attention to the PTRU. Once attention is gained, the  
32 user may ensure that the current recording accurately  
33 reflects the present task or activity. The timing of  
34 this reminder buzzer may be under control of the user,  
35 programmed at the PTRU, or programmed on the computer  
36 and later sent to the PTRU by the PM.

1 The presence of a buzzer within the PTRU, or other  
2 methods of drawing the attention of the user to the  
3 PTRU, offers an alternative mode of operation. In this  
4 mode, the current activity is recorded on the PTRU only  
5 following the sounding of the buzzer. The sounding may  
6 be programmed to occur at regular intervals, according  
7 to a pre-determined pattern, or randomly. Thus  
8 statistical information on the activities, events or  
9 conditions is arrived at. In a further variation,  
10 times specific to a sequence of tasks is pre-programmed  
11 into the PTRU, and the PTRU sounds a prompt to indicate  
12 to the user that he or she should commence phases of  
13 the sequence. Commencement may be confirmed by the  
14 user on the PTRU for later reporting.

15  
16 The 'Port Method' is the means by which information,  
17 which may include operational parameters such as  
18 battery condition, is transferred from the PTRU to the  
19 computer (the PTRU's output function). In its simplest  
20 form, the PM need only allow information to flow from  
21 PTRU to the computer although in some applications data  
22 must flow from computer to the PTRU to allow the  
23 programming and configuration of the PTRU. Examples of  
24 programming and configuration include setting of  
25 parameters held within the PTRU such as PTRU reference  
26 number or reminder buzzer duration and frequency.  
27 Another important example, in PTRUs that record more  
28 than one level of reference (such as the  
29 client/activity combinations referred to in the  
30 descriptions of the second and third embodiments) is  
31 the ability to "screen out" certain key permutations,  
32 which are deemed to be impermissible.

33

34 Suitable methods for transmission of the data include:

35

36 (a) a readily attached and detached electrical or

- 1           fibre optic cable, with data transmission by  
2           direct electrical connection or optical means;  
3       (b) broadly spread infra-red data transmission which  
4           can be rendered active when PTRU and computer are  
5           in proximity;  
6       (c) closed-channel radio transmission;  
7       (d) close inductive coupling;  
8       (e) adaptation to enable use of cabled and radio  
9           telephone links;  
10       (f) audio/ultrasonic links.

11

12       Connection methods to PTRU and to the computer would  
13       vary according to the methods utilised, but as the PTRU  
14       is likely to be battery powered, where possible the PM  
15       should utilise such power as is available from the  
16       computer while data is being transferred.

17

18       The advantages of the invention and/or the ways in  
19       which the disadvantages of previously known arrangement  
20       are overcome, include:-

21

- 22       -     immediate recording of time information;  
23             previously known arrangements often required  
24             recording from memory, or following and  
25             intermediate temporary storage of information  
26       -     portability of the means of recording; practical  
27             realizations of the invention allow the recording  
28             to take place in any location, in contrast to  
29             previously known arrangements which may be  
30             impossible, inconvenient or impractical to have  
31             present at the time of recording  
32       -     reduces the effort and time required by users  
33       -     simplicity of recording; previously known  
34             arrangements require knowledge and understanding  
35             of computer systems  
36       -     the PTRU performs a specific function, and that



1 function only, meaning that it is always available  
2 when required.

3  
4  
5 The preferred embodiments described above with  
6 reference to Figs 1-6 have referred to conventional  
7 work-charging but the invention can also be applied to  
8 quite different activities etc, and to the recording of  
9 respective times and durations. For example, in a  
10 medical experiment monitoring the effects of continuing  
11 pain relief, the invention can be used to record the  
12 patient's current perceived level of discomfort (eg  
13 "negligible", "mild", "severe"), together with the  
14 duration and timing of the periods spent at each such  
15 discomfort level, and the timing of medication (eg  
16 doses of analgesic). As another example of possible  
17 applications of the invention, a psychological  
18 experiment could employ the invention to record the  
19 timing and duration of different forms of interaction  
20 between a mother and child, eg physical contact of  
21 various kinds, verbal contact, etc.

22  
23 While certain preferred embodiments have been described  
24 above, the invention is not restricted thereto, in that  
25 modifications and variations can be adopted without  
26 departing from the scope of the invention as defined in  
27 the appended claims.

1     CLAIMS

2

3     1.    A recording system for the collection and  
4     reporting of information relating to the occurrence  
5     and/or timing of activities, events, or conditions, the  
6     recording system comprising

7

8     (a)   inputting means for inputting and internally  
9     storing information identifying or otherwise  
10    relating to an activity, event, or condition;

11

12   (b)   recording means for recording and internally  
13   storing information relating to the duration  
14   and/or time of occurrence of said activity, event,  
15   or condition; and

16

17   (c)   downloading means for subsequently and selectively  
18   downloading the internally stored information to  
19   an external computer for processing of the  
20   information therein.

21

22   2.    A recording system as claimed in Claim 1 wherein  
23   said inputting means comprises a plurality of input  
24   means, each said input means being associated with a  
25   preselected activity, event, or condition.

26

27   3.    A recording system as claimed in Claim 2 wherein  
28   each said input means is capable of being associated  
29   with selected types and/or classes of activity, event,  
30   or condition.

31

32   4.    A recording system as claimed in any preceding  
33   claim wherein said inputting means contains a source of  
34   pre-stored signals representing predetermined  
35   activities, events, or conditions, and the source is  
36   such that a predetermined signal may be selected by

1 scrolling through the pre-stored signals.

2

3 5. A recording system as claimed in any preceding  
4 claim wherein said inputting means includes audio  
5 signal generation means operable to indicate correct  
6 selection of an input means and/or to indicate the  
7 elapse of a predetermined period of time associated  
8 with a particular activity, event, or condition.

9

10 6. A recording system as claimed in any preceding  
11 claim wherein the inputting means comprises a bar-code  
12 reader means comprising visual display means operable  
13 to display a de-coded reading or to display an  
14 alternative message otherwise indicative of a read  
15 bar-code.

16

17 7. A recording system as claimed in any preceding  
18 claim wherein the recording means comprises clock means  
19 which may indicate absolute time (ie time of day, and  
20 date) and/or elapsed time since initiation.

21

22 8. A recording system as claimed in any preceding  
23 claim wherein the downloading means comprises  
24 fibre-optic cable means, infra-red broadcast or beam  
25 transmission means, closed-channel radio transmission  
26 means, or close-range inductive coupling means.

27

28 9. A recording system as claimed in any preceding  
29 claim wherein the downloading means is capable of  
30 uploading signals which may be appropriate for  
31 programming or reprogramming the recording system.

32

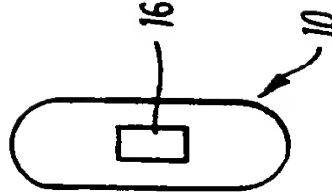
33 10. A method of collecting and reporting information  
34 relating to the occurrence and/or timing of activities,  
35 events, or conditions, said method comprising the steps  
36 of:

- 1 (a) providing a recording system as claimed in any  
2 preceding claim;  
3  
4 (b) selecting an activity, event, or condition about  
5 which information is to be collected and reported;  
6  
7 (c) operating the inputting means of said recording  
8 system to input and internally store information  
9 identifying or otherwise relating to the selected  
10 activity, event, or condition;  
11  
12 (d) operating the recording means of said recording  
13 system to record and internally store information  
14 relating to the duration and/or time of occurrence  
15 of the selected activity, event, or condition; and  
16  
17 (e) subsequently coupling the downloading means of  
18 said recording system to an external computer and  
19 selectively downloading the internally stored  
20 information to said external computer for  
21 processing of the information therein.  
22

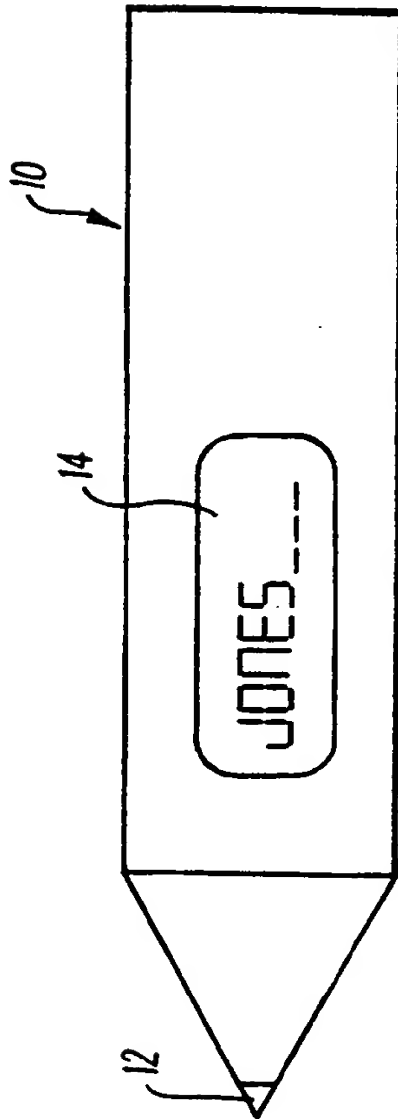
23 11. A method as claimed in Claim 10 where the  
24 recording means of said recording system comprises  
25 clock means which indicates only elapsed time since  
26 initiation (ie without indication of time of day, or  
27 date) and where the selected activity, event, or  
28 condition is continuous from initiation to downloading,  
29 or where a plurality of selected activities, events, or  
30 conditions are individually continuous and mutually  
31 consecutive such as to constitute a continuous series  
32 from first initiation until downloading, the external  
33 computer being programmed and operated to calculate the  
34 absolute time and date of the initiation or the  
35 respective initiation of the or each activity, event,  
36 or condition by subtracting the elapsed time or

- 1     respective succession of elapsed times from the
- 2     absolute time of downloading.
- 3

1 / 3



**Fig. 2**



**Fig. 1**

2 / 3

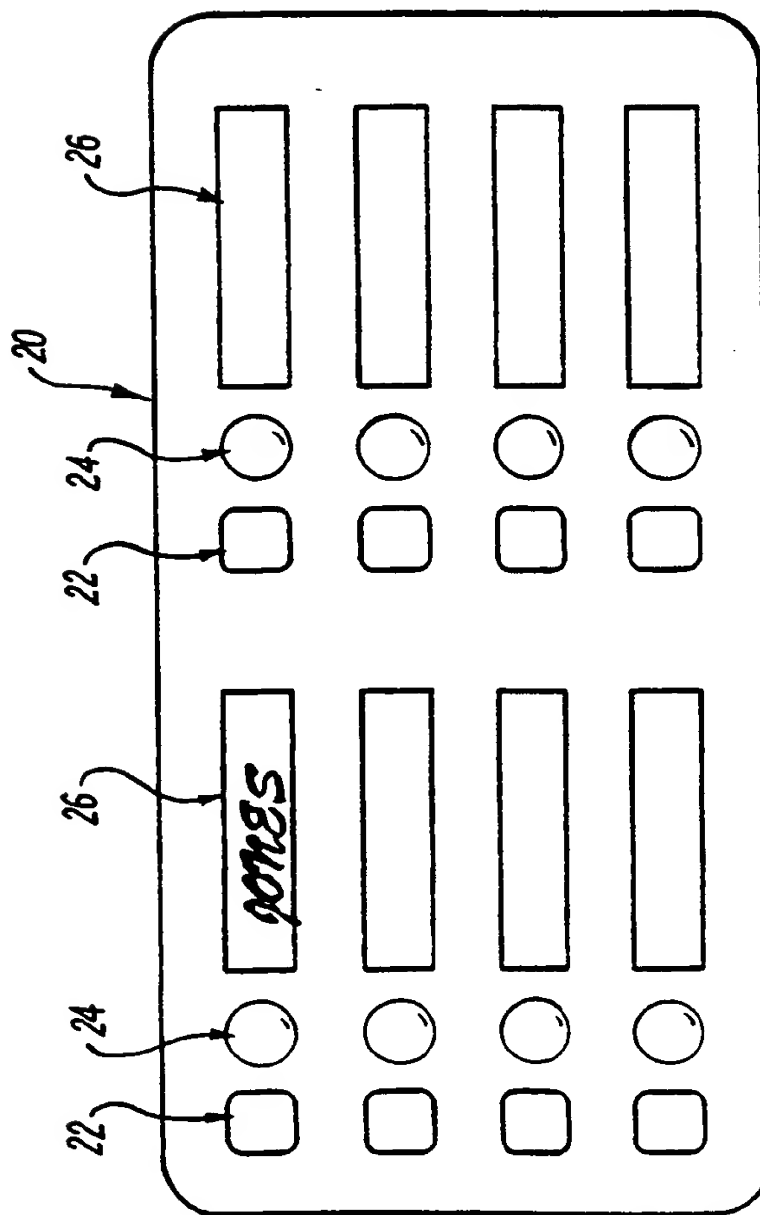


Fig. 3

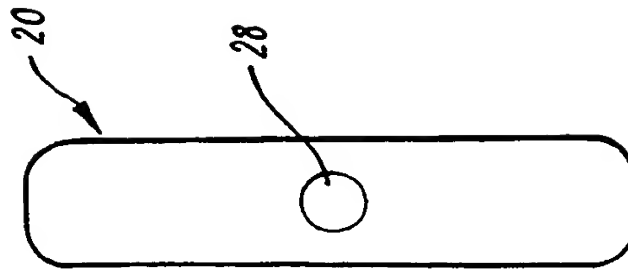


Fig. 4

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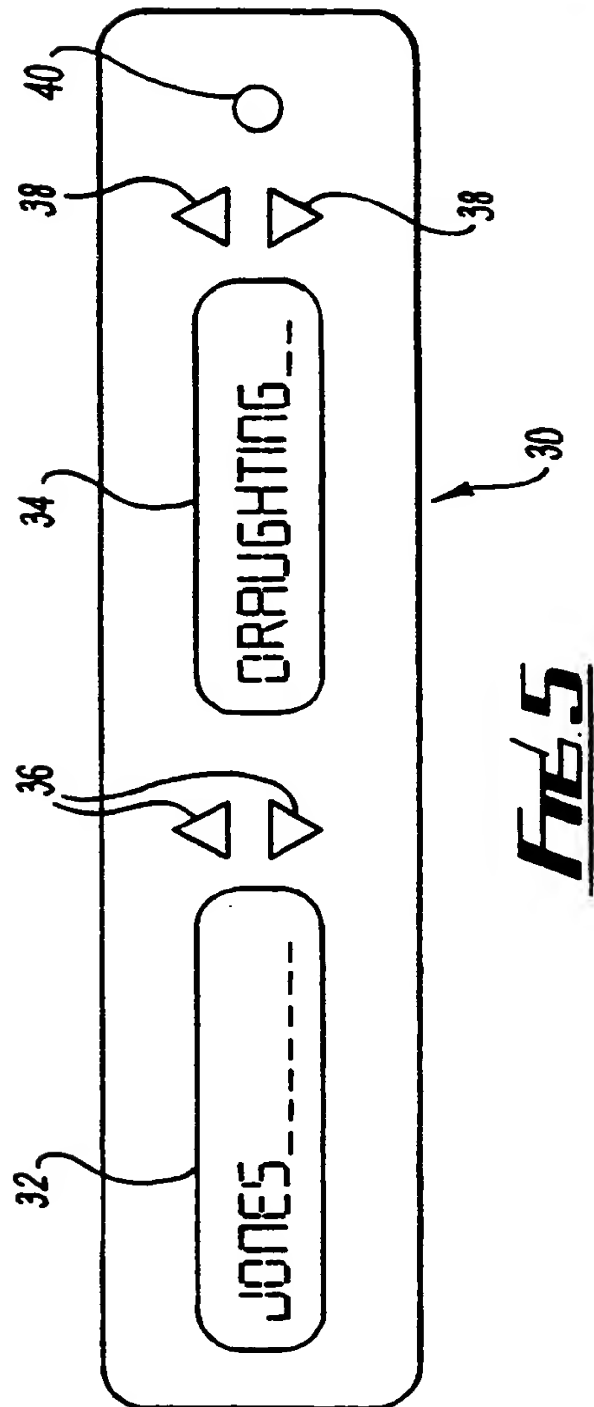


FIG. 5

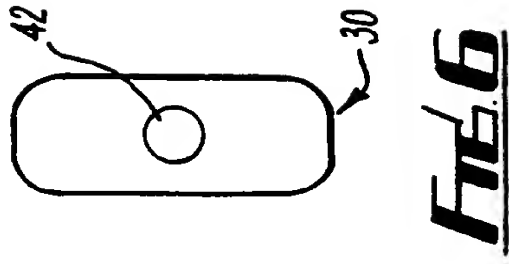


FIG. 6



## INTERNATIONAL SEARCH REPORT

Intern al Application No  
PCT/GB 96/01947

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 G07C1/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 G07C G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE,A,44 43 850 (TRINITY DATENSYSTEME GMBH) 20 July 1995 see abstract; claims; figures see column 1, line 28 - column 5, line 26	1-5,7-10
A	---	6,11
X	WO,A,94 00827 (SQUIBBS ROBERT FRANCIS ;HEPWORTH JOHN MALCOLM (GB)) 6 January 1994 see abstract; claims; figures see page 6, line 23 - page 9, line 21	1,6,7,10
Y	---	2-5,11
X	US,A,4 115 870 (LOWELL ARTHUR C) 19 September 1978 see abstract; claims; figures see column 1, line 27 - column 3, line 10	1-4,7,10
A	---	11
	--- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

10 December 1996

Date of mailing of the international search report

20. 12. 96

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PCT/GB 96/01947

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	---	2,3,11
X	CH,A,673 164 (HTP HIGH TECHNOLOGY PARTNERS A) 15 February 1990 see page 3, column 1, line 25 - page 4, column 2, line 58	1,2,6-8, 10
X	---	1,2,7,8, 10
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Y	---	2-4,11
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A	---	1,10
Y	US,A,4 197 561 (MCMULLEN JOHN W G ET AL) 8 April 1980 see abstract; claims; figures see column 4, line 48 - line 53	5
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Information on patent family members

International Application No

PCT/GB 96/01947

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US-A-4115870	19-09-78	NONE	
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US-A-5068787	26-11-91	NONE	
GB-A-2008815	06-06-79	US-A- 4195220 JP-A- 54089774	25-03-80 17-07-79
US-A-4197561	08-04-80	NONE	

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